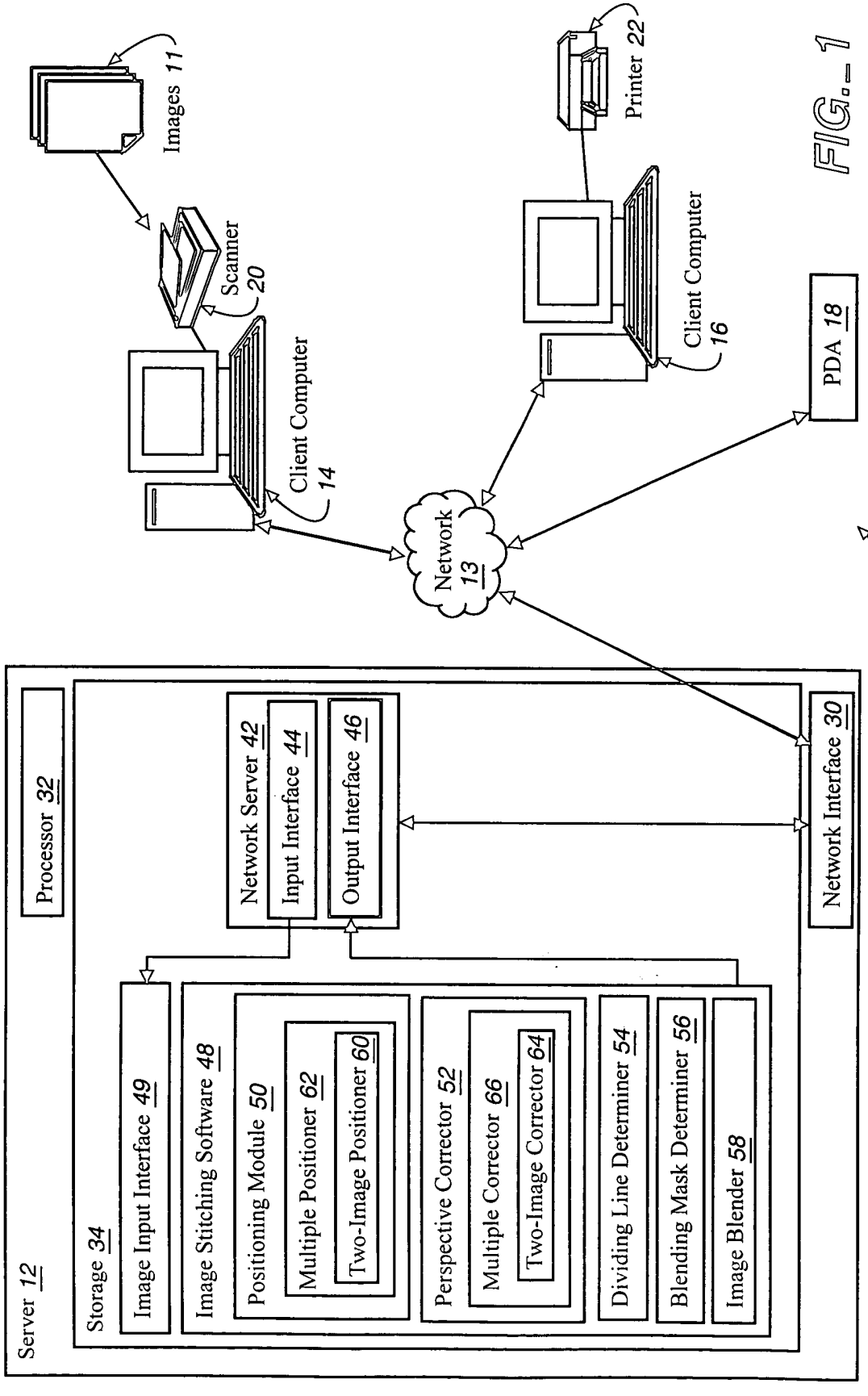
Images 11
Scanner 20
Client Computer 14
Printer 22
Client Computer 16
PDA 18
Network 13
10
Server 12
Processor 32
Storage 34
Image Input Interface 49
Image Stitching Software 48
Positioning Module 50
Multiple Positioner 62
Two-Image Positioner 60
Perspective Corrector 52
Multiple Corrector 66
Two-Image Corrector 64
Dividing Line Determiner 54
Blending Mask Determiner 56
Image Blender 58
Network Server 42
Input Interface 44
Output Interface 46
Network Interface 30

FIG. 1

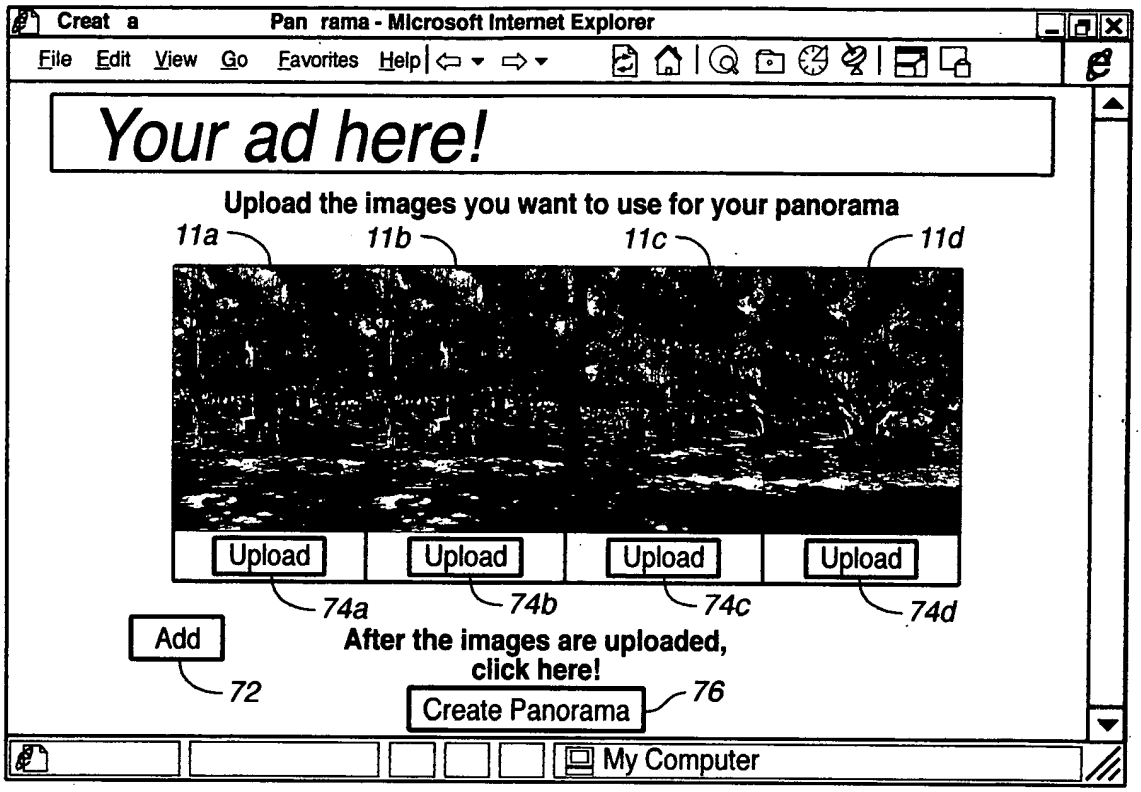

FIG._2A

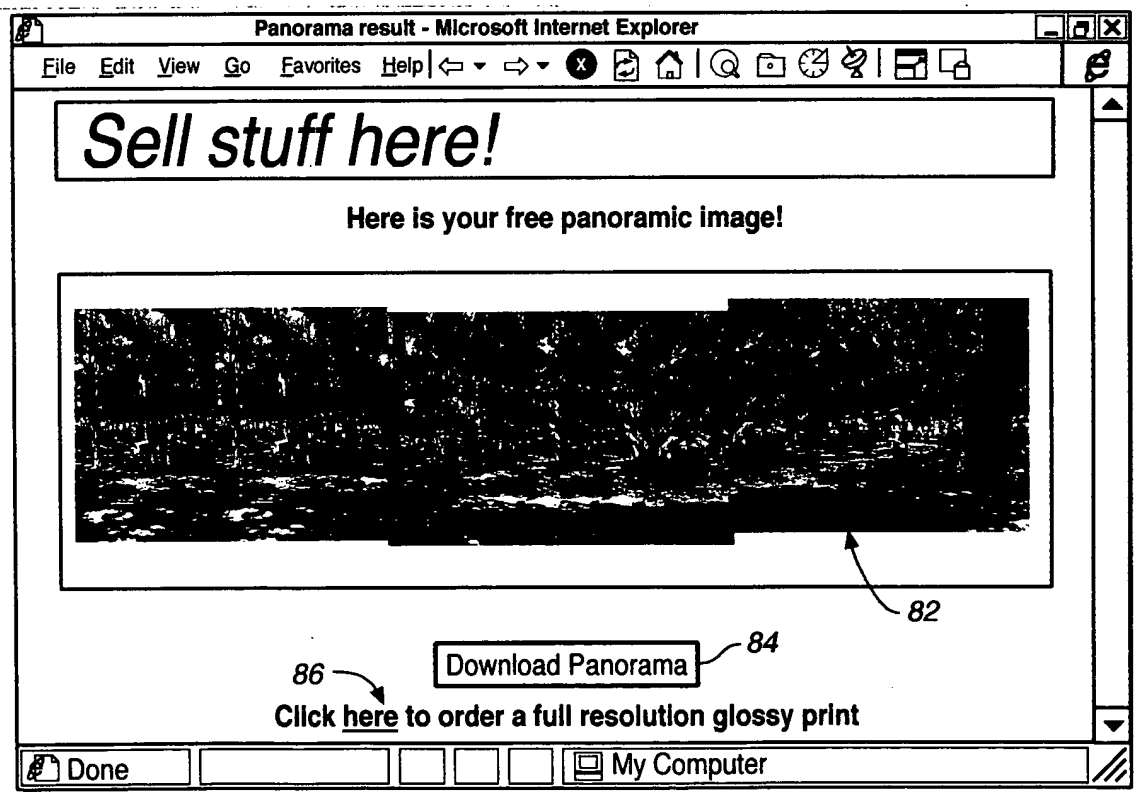

FIG._2B

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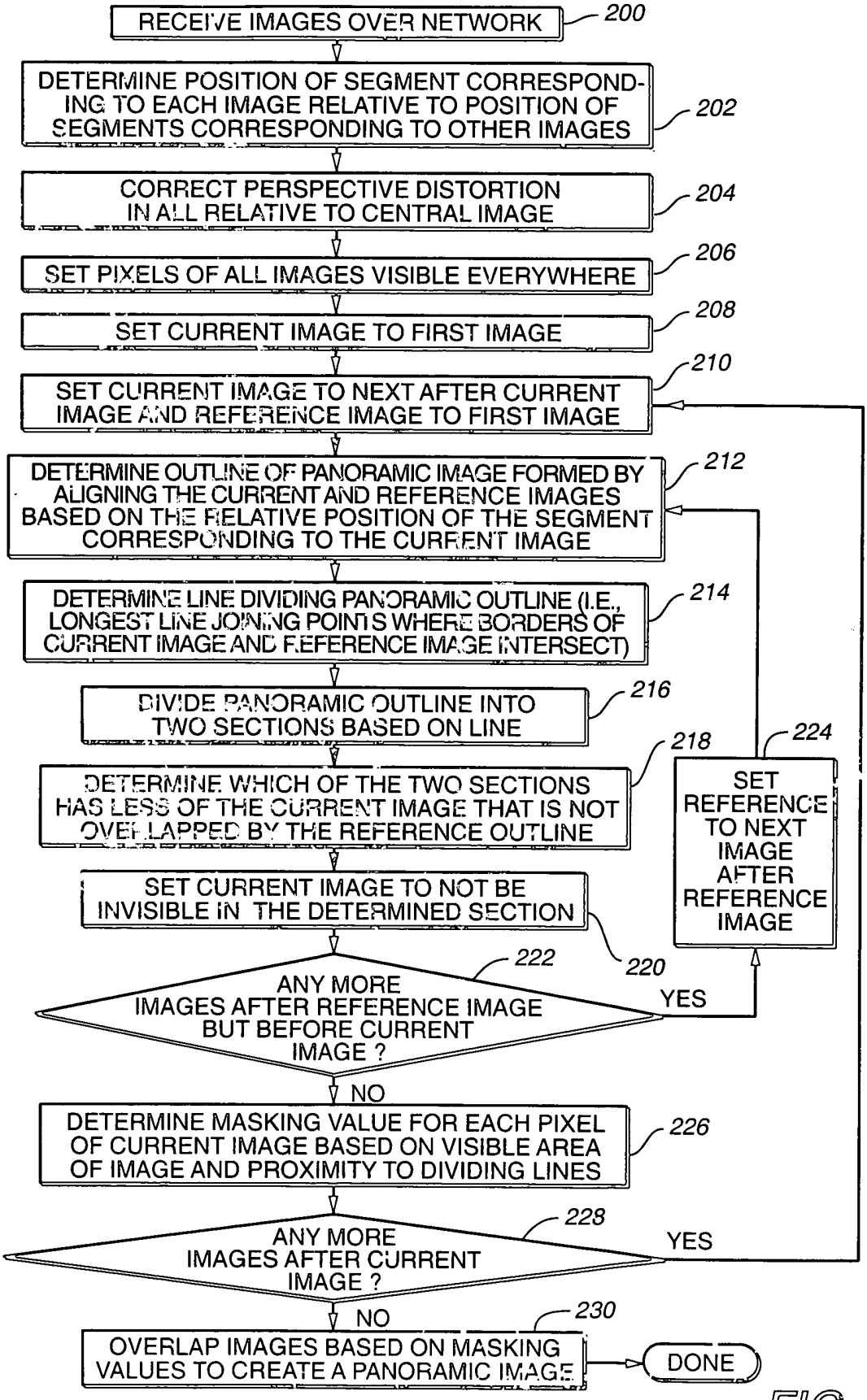

RECEIVE IMAGES OVER NETWORK
200
DETERMINE POSITION OF SEGMENT CORRESPONDING TO EACH IMAGE RELATIVE TO POSITION OF SEGMENTS CORRESPONDING TO OTHER IMAGES
202
CORRECT PERSPECTIVE DISTORTION IN ALL RELATIVE TO CENTRAL IMAGE
204
SET PIXELS OF ALL IMAGES VISIBLE EVERYWHERE
206
SET CURRENT IMAGE TO FIRST IMAGE
208
SET CURRENT IMAGE TO NEXT AFTER CURRENT IMAGE AND REFERENCE IMAGE TO FIRST IMAGE
210
DETERMINE OUTLINE OF PANORAMIC IMAGE FORMED BY ALIGNING THE CURRENT AND REFERENCE IMAGES BASED ON THE RELATIVE POSITION OF THE SEGMENT CORRESPONDING TO THE CURRENT IMAGE
212
DETERMINE LINE DIVIDING PANORAMIC OUTLINE (I.E., LONGEST LINE JOINING POINTS WHERE BORDERS OF CURRENT IMAGE AND REFERENCE IMAGE INTERSECT)
214
DIVIDE PANORAMIC OUTLINE INTO TWO SECTIONS BASED ON LINE
216
DETERMINE WHICH OF THE TWO SECTIONS HAS LESS OF THE CURRENT IMAGE THAT IS NOT OVERLAPPED BY THE REFERENCE OUTLINE
218
SET CURRENT IMAGE TO NOT BE INVISIBLE IN THE DETERMINED SECTION
220
SET REFERENCE TO NEXT IMAGE AFTER REFERENCE IMAGE
224
ANY MORE IMAGES AFTER REFERENCE IMAGE BUT BEFORE CURRENT IMAGE ?
222
YES
NO
DETERMINE MASKING VALUE FOR EACH PIXEL OF CURRENT IMAGE BASED ON VISIBLE AREA OF IMAGE AND PROXIMITY TO DIVIDING LINES
226
ANY MORE IMAGES AFTER CURRENT IMAGE ?
228
YES
NO
OVERLAP IMAGES BASED ON MASKING VALUES TO CREATE A PANORAMIC IMAGE
230
DONE

FIG. 3

Applicant: John Peterson
Serial No.: 09/657,949 Filing Date: 09/08/2001
Title: "A Server For Merging Images To Form A Panoramic Image"
Attorney Docket No.: 07844-458001

FIG._4A

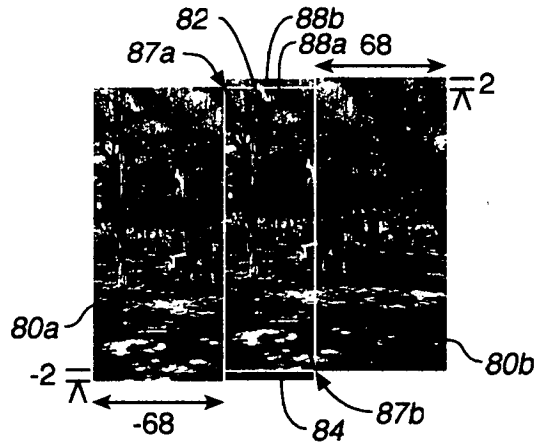


FIG._4F

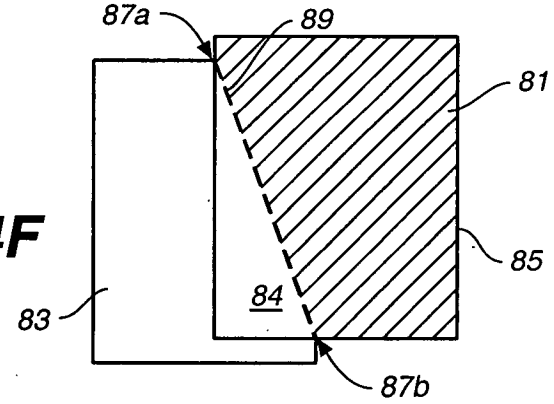


FIG._4B

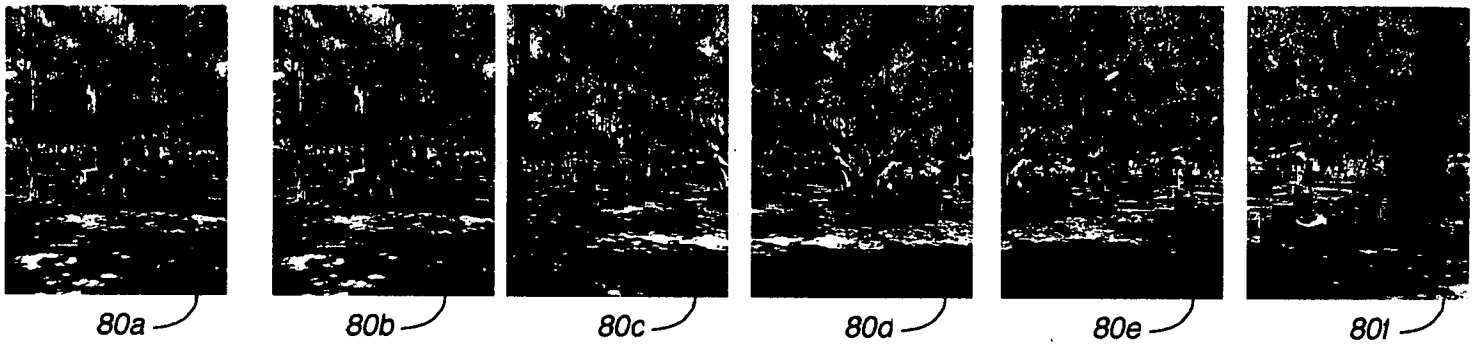
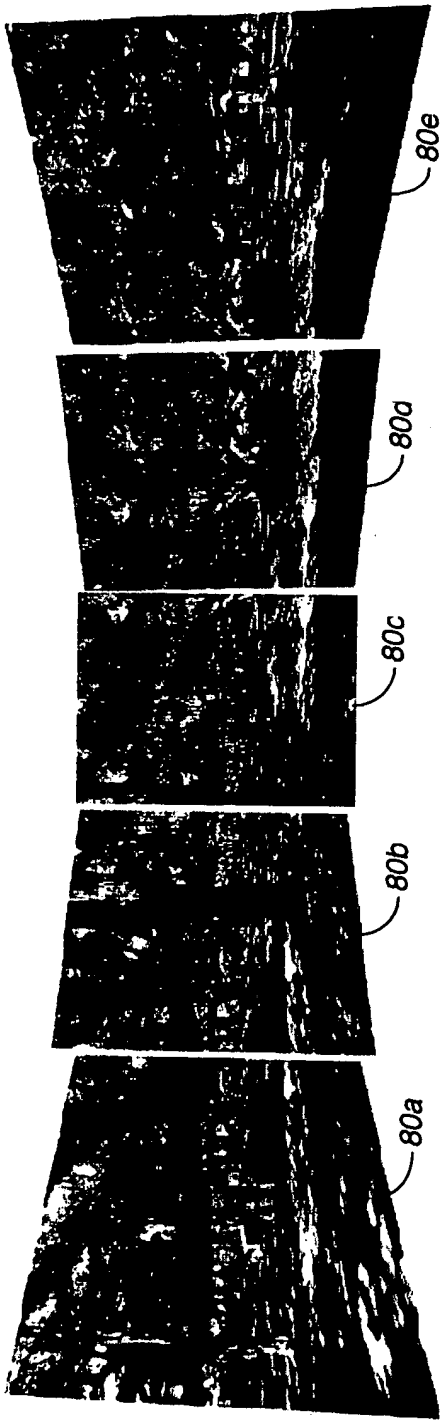


FIG._4C

Adjacent Lists

86a	86b	86c	86d	86e	86f
80b: 68, 2	80a: -68, -2 80c: 69, 4	80b: -69, -4 80d: 66, -1	80c: -66, -1 80e: 66, -1	80d: -66, 1 80e: 67, -2	80e: -67, 2

Best Available Copy



Select 80c as "base"
Align 80b, 80d to 80c
Align 80a to 80b and 80e to 80d

FIG._4D

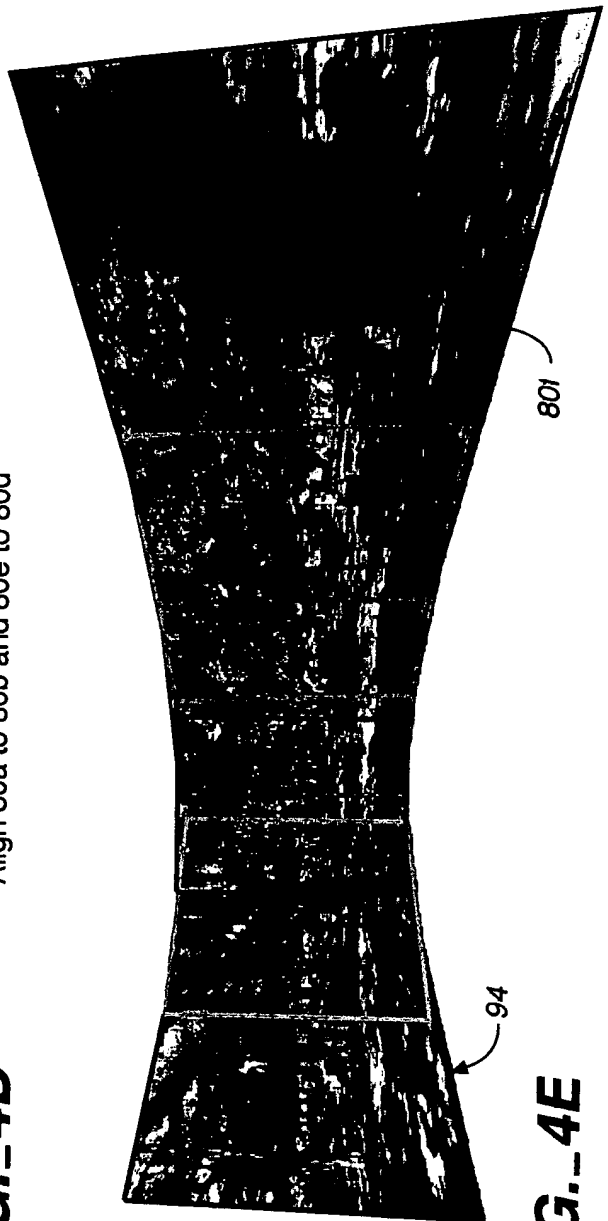


FIG._4E

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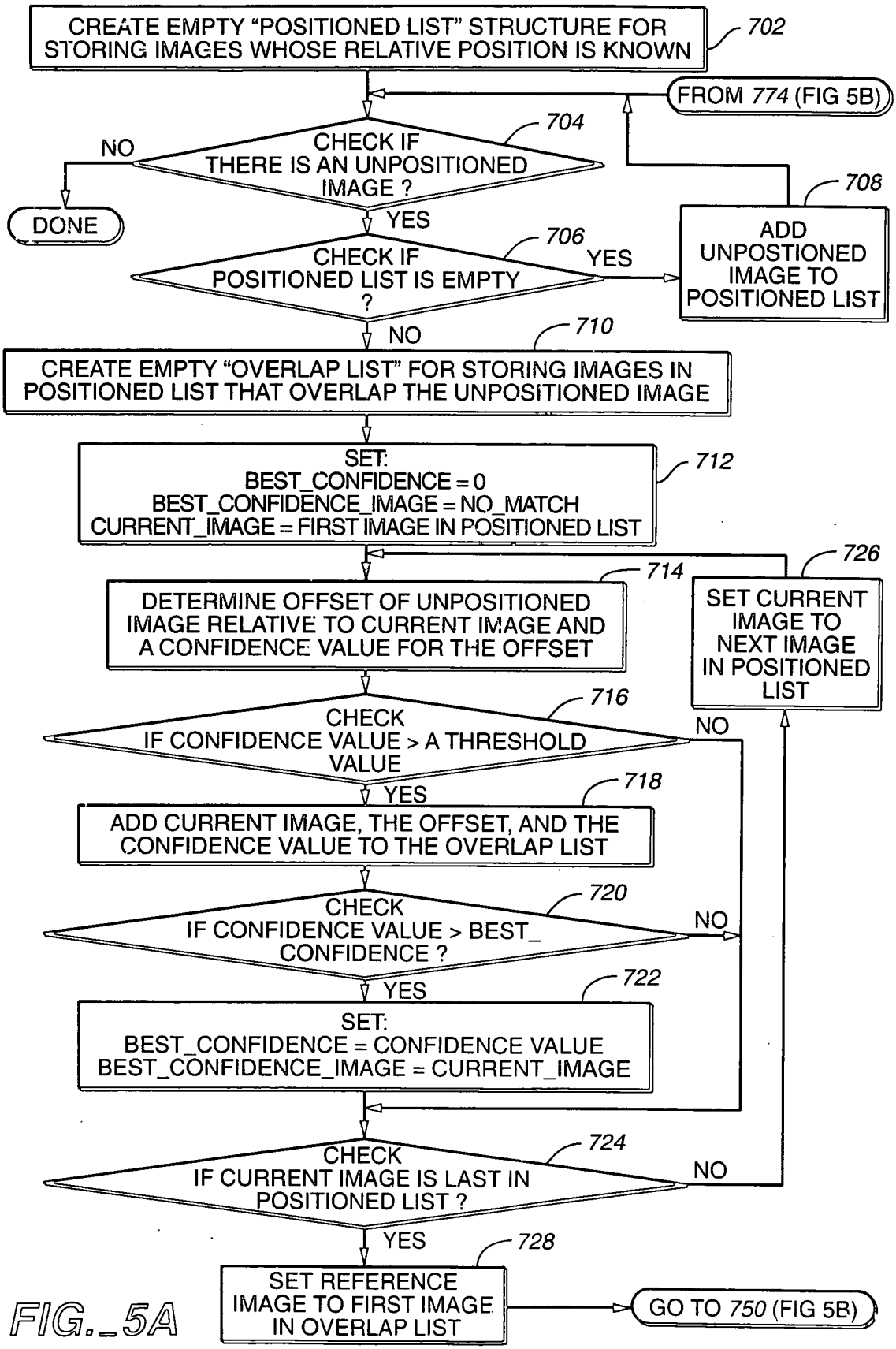
CREATE EMPTY "POSITIONED LIST" STRUCTURE FOR STORING IMAGES WHOSE RELATIVE POSITION IS KNOWN
702
FROM 774 (FIG 5B)
CHECK IF THERE IS AN UNPOSITIONED IMAGE ?
704
NO
DONE
YES
CHECK IF POSITIONED LIST IS EMPTY ?
706
YES
ADD UNPOSTIONED IMAGE TO POSITIONED LIST
708
NO
CREATE EMPTY "OVERLAP LIST" FOR STORING IMAGES IN POSITIONED LIST THAT OVERLAP THE UNPOSITIONED IMAGE
710
SET:
BEST_CONFIDENCE = 0
BEST_CONFIDENCE_IMAGE = NO_MATCH
CURRENT_IMAGE = FIRST IMAGE IN POSITIONED LIST
712
DETERMINE OFFSET OF UNPOSITIONED IMAGE RELATIVE TO CURRENT IMAGE AND A CONFIDENCE VALUE FOR THE OFFSET
714
SET CURRENT IMAGE TO NEXT IMAGE IN POSITIONED LIST
726
CHECK IF CONFIDENCE VALUE > A THRESHOLD VALUE
716
NO
YES
ADD CURRENT IMAGE, THE OFFSET, AND THE CONFIDENCE VALUE TO THE OVERLAP LIST
718
CHECK IF CONFIDENCE VALUE > BEST_ CONFIDENCE ?
720
NO
YES
SET:
BEST_CONFIDENCE = CONFIDENCE VALUE
BEST_CONFIDENCE_IMAGE = CURRENT_IMAGE
722
CHECK IF CURRENT IMAGE IS LAST IN POSITIONED LIST ?
724
NO
YES
SET REFERENCE IMAGE TO FIRST IMAGE IN OVERLAP LIST
728
GO TO 750 (FIG 5B)

FIG._5A

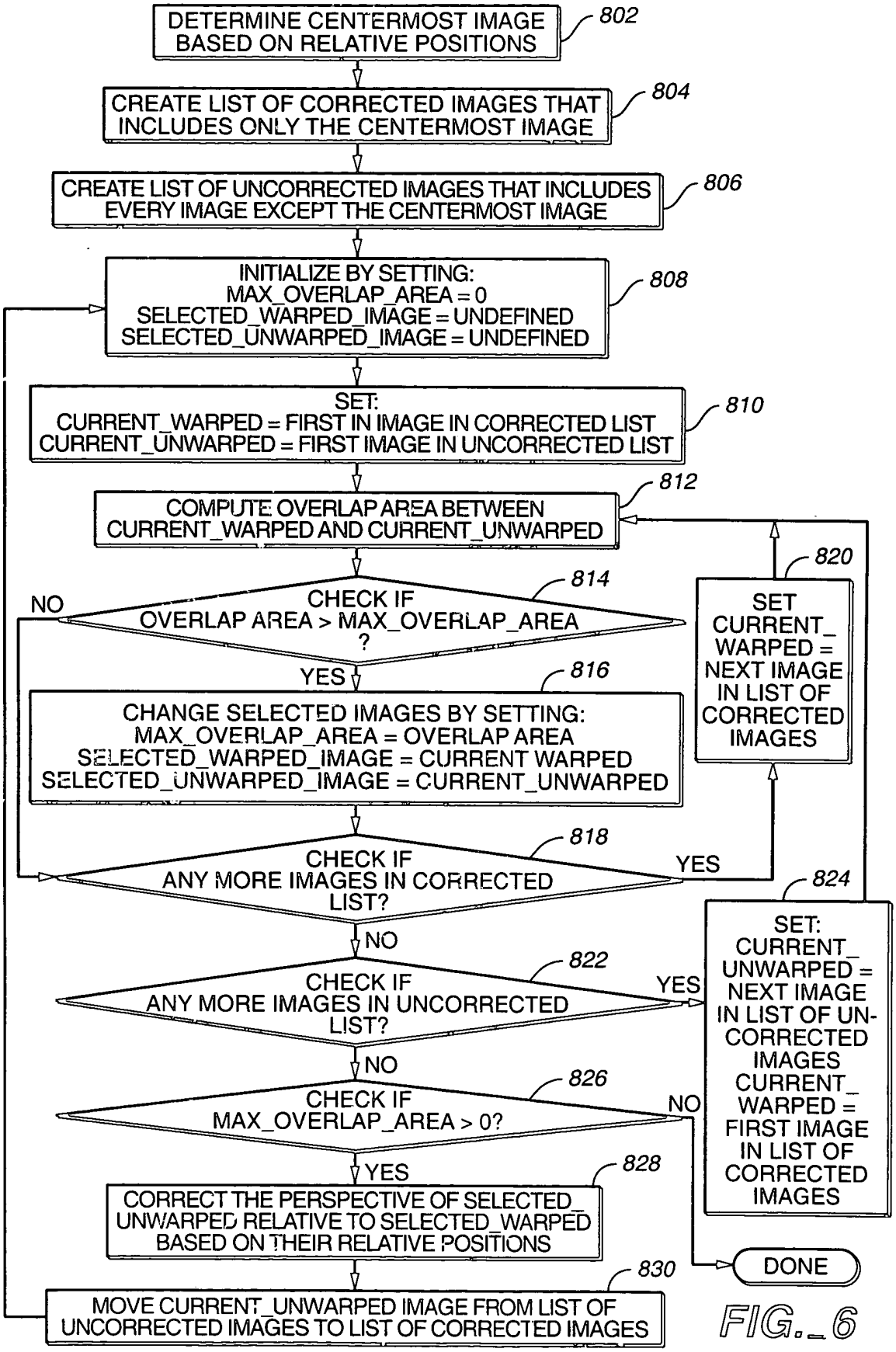
DETERMINE CENTERMOST IMAGE BASED ON RELATIVE POSITIONS
802
CREATE LIST OF CORRECTED IMAGES THAT INCLUDES ONLY THE CENTERMOST IMAGE
804
CREATE LIST OF UNCORRECTED IMAGES THAT INCLUDES EVERY IMAGE EXCEPT THE CENTERMOST IMAGE
806
INITIALIZE BY SETTING:
MAX_OVERLAP_AREA = 0
SELECTED_WARPED_IMAGE = UNDEFINED
SELECTED_UNWARPED_IMAGE = UNDEFINED
808
SET:
CURRENT_WARPED = FIRST IN IMAGE IN CORRECTED LIST
CURRENT_UNWARPED = FIRST IMAGE IN UNCORRECTED LIST
810
COMPUTE OVERLAP AREA BETWEEN CURRENT_WARPED AND CURRENT_UNWARPED
812
CHECK IF OVERLAP AREA > MAX_OVERLAP_AREA ?
814
NO
YES
CHANGE SELECTED IMAGES BY SETTING:
MAX_OVERLAP_AREA = OVERLAP AREA
SELECTED_WARPED_IMAGE = CURRENT WARPED
SELECTED_UNWARPED_IMAGE = CURRENT_UNWARPED
816
SET CURRENT_ WARPED = NEXT IMAGE IN LIST OF CORRECTED IMAGES
820
CHECK IF ANY MORE IMAGES IN CORRECTED LIST?
818
YES
NO
SET: CURRENT_ UNWARPED = NEXT IMAGE IN LIST OF UN-CORRECTED IMAGES CURRENT_ WARPED = FIRST IMAGE IN LIST OF CORRECTED IMAGES
824
CHECK IF ANY MORE IMAGES IN UNCORRECTED LIST?
822
YES
NO
CHECK IF MAX_OVERLAP_AREA > 0?
826
NO
YES
CORRECT THE PERSPECTIVE OF SELECTED_ UNWARPED RELATIVE TO SELECTED_WARPED BASED ON THEIR RELATIVE POSITIONS
828
DONE
MOVE CURRENT_UNWARPED IMAGE FROM LIST OF UNCORRECTED IMAGES TO LIST OF CORRECTED IMAGES
830

FIG._6

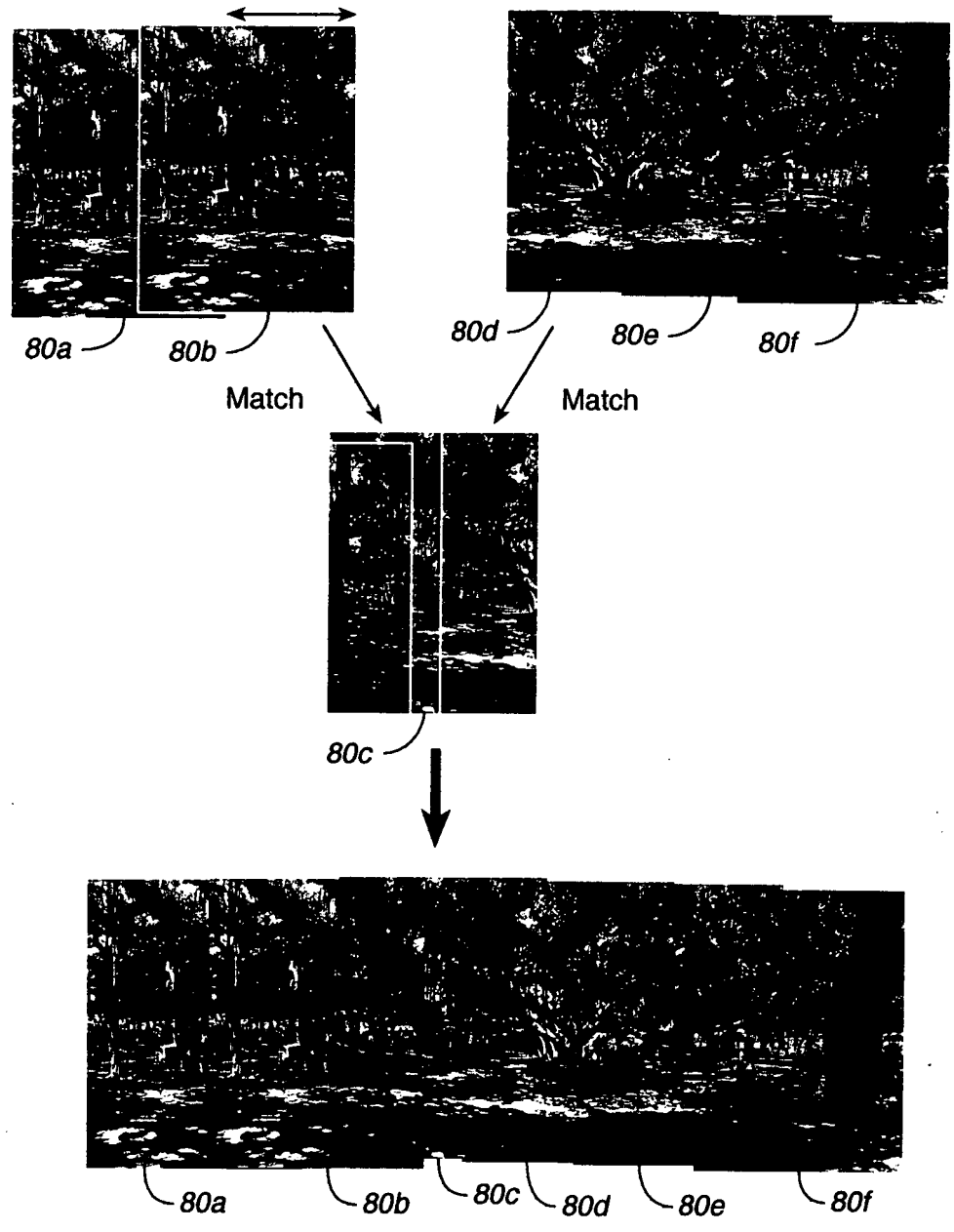

FIG._7

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